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by

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A THESIS

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MASTER OF DESIGN

IN

INDUSTRIAL DESIGN
DEPARTMENT OF ART AND DESIGN

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Applying Off-The-Shelf Design and Digital Image Prototyping to the Fabrication of Lamp Prototypes

Michael Christopher Syms

A written report in support of a thesis by project submitted
to The Faculty of Graduate Studies and Research in partial
fulfillment of the requirement for the degree of Master of
Design in Industrial Design, Department of Art and Design.

Edmonton, Alberta
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michael syms



illuminations

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Abstract

This thesis by project documents the application of off-the-shelf design and digital image prototyping to the development and fabrication of a variety of lamp prototypes. The design process is documented from design criteria to initial prototype fabrication and focus group research to the introduction of a digital image prototyping method to aid in design decisions.

Included in the report is a historical background discussion of off-the-shelf design and possible legal issues involved with this design methodology. The technical requirements of the digital image prototyping method and applications are also included.

Using off-the-shelf and digital image prototyping is a cost effective way in which to explore product evaluation. With emerging interest in e-commerce and online market research the use of digital prototypes will become more important as the need for rapid product development and interest in more personalized designs increase.

Table of Contents

• Background	1
• Legal Issues	6
• Materials	7
• Valk Lamp Prototype	8
Fabrication	8
Safety Testing	10
Redesign	10
• Marketing Research	12
Focus Group Results	13
• Mushroom Lamp Prototype	15
• Digital Image Prototyping	17
Method	17
Prototypes	19
• Applications For Digital Image Prototyping	26
• From Digital Image Prototyping to Working Prototypes	28
Prototypes	28
• Conclusion	33
• Recommendations	34
• Bibliography	35
• List of Photographic/Illustration Credits	39
• Appendix	40

Background

The idea of using found objects or off-the-shelf components is not new. Since the first time we picked up a stick and used it as a tool man has had the imagination to find creative and exciting ways to use objects for reasons that they were not originally intended for. Developing countries have often used found objects in their designs out of necessity. A “Mexican stove from Jalisco (is) made of used license plates and sold for about 8 cents” (Papanek 48) (Fig. 1) and designers designing for these countries often take this into consideration. A radio designed by Victor Papanek and George Seeger in the late 1960’s utilized a “used juice can and uses paraffin wax and a wick as a power source” (Papanek 163) (Fig. 2). Although the one transistor radio could only receive one radio station, it used no batteries and the wax could be substituted with other combustible materials once it was depleted. As a designer there appears to be no limit to the objects we find surrounding ourselves. The difficult task is having the imagination to see the potential in common objects.



Fig.1



Fig. 2

As designers, the ability to recognize this potential is crucial to the design and prototyping process. The integration of off-the-shelf components has been around since the beginning of design, although it is a term normally reserved for the computer and electronics industry. Competing manufacturers will use the same smaller components made by a specializing company such as transistors and diodes because it is a more cost effective way of assembling the final product. If each company manufactured all of the individual components needed for a product the price would rise significantly. It makes no difference to the consumer that a Sony and a Panasonic product may have a number of identical components on the inside.



Fig. 3

In recent product design history the use of off-the-shelf components or found objects was popularized in the late 1950s in the designs of Achille and Pier Castiglioni. Achille “Castiglioni's approach to design is natural, unbiased, subtly imbued with irony. To question the typology of the object to be designed, to move it into another field, to use already existing items in ways no-one had thought of before, to re-design, to utilize the “objet trouve”

(<http://www.venturadesign.com.au/html/castiglioni.html>). The design of the Mezzadro stool in 1957 (Fig. 3) used an off-the-shelf tractor seat attached to a simple base. The Sella stool (Fig. 4), also of 1957, used a bicycle seat attached to a rocking half spherical base. Achille Castiglioni also used this ready-made approach to furniture design in his Toio floor lamps of 1962 in which he used the headlamps from a car mounted on a minimalistic metal base. Castiglioni did not try to hide or conceal the use of found or off-the-shelf components instead he celebrated them. Castiglioni has continued to use off-the-shelf components throughout his career. His menorah of 1985 (Fig. 5)



Fig. 4



Fig. 5

is an example of this. “Castiglioni's version of the traditional Jewish candle holder features ready-made handlebar caps (direct from a Japanese motorcycle) that provide a perfect hold” (www.retromodern.com/exhibit/alessi_nip/1985b.html) for the candles. Castiglioni was not the only designer to incorporate the use of found components although he is recognized as one of the best practioners of this approach.



Fig. 6

In the 1980s there was a resurgence of this design methodology known as objet-trouve “pioneered perhaps by Daniel Weil who in 1981 stunned the public as well as his teachers with a Duchamp inspired degree show at the Royal College of Art, London, using stacked plastic funnels as lights as well as other ready-mades.” (Scheuer 49-51) In 1984 Jasper Morrison in *“The poet does not polish...writes about a new type of designer: ‘His office has no drawing board but is filled with these strangely significant objects which sooner or later he will invent a use for’”(Scheuer 51). In this*

same year Morrison produced a table where the legs were a stack of terracotta flower pots. It must be remembered that the idea of the found, in such cases were, “searched for systematically”(Scheuer 51) in hardware, garden and thrift stores. “The German light designer Ingo Maurer began to use bent wires, found plastic chicken feet and more recently, a tea strainer turned halogen light”(Scheuer 52). One of the later “objet trouve” pieces produced is the Scherbengericht chandelier (Fig. 6), done in the mid 1980s; it involves a dismantled and broken coffee set hand glued together. This object is viewed by some as the end to the modern “objet trouve” movement due to its overly elaborate design and high production cost.

In the July/August 2000 issue of Azure magazine we see an example of the resurgence of the use of off-the-shelf components. Canadian freelance designer Antoine Laverdiere presented a “series of clever and seductive assemblages of plastic containers” (Beringer 45) (Fig. 7, Fig. 8) in the form of lights and lighting fixtures.

“Laverdiere got the idea for the collection from an old piece of Tupperware that bore an uncanny resemblance to a lamp component he had designed but lacked the financial means to realize” (Beringer 45)



Fig. 7

Laverdiere's approach most closely resembles that of this thesis by project. However, where Laverdiere, Castiglioni, and other objet trouve designers have used the off-the-shelf or found components as the centerpiece of the design, the approach in this thesis work is to remove the components as far away from their original purpose as possible.



Fig. 8

The importance of the prototype as a design tool for testing and evaluating the product or services to be rendered cannot be disputed. IDEO one of North America's leading design firms states "prototyping is problem solving. It's a culture and a language...what counts is moving the ball forward, achieving some part of your goal"(Kelley 103). Prototypes are beneficial to the designer and the client as it is often easier to evaluate a three-dimensional working product than it is

a two-dimensional drawing. "It is easy to reject a dry report or a flat drawing. But models often surprise, making it easier to change your mind and accept new ideas."(Kelley 111)

Model making and prototyping practices over the past twenty years were long and costly processes. Traditional means of prototyping include the manufacture of tools and dies for mold making. Additionally, highly skilled and trained technical staff are needed to perform the model making task. This resulted in long lead and processing time repercussions. Additive and subtractive rapid prototyping technology was introduced in



Fig.9

the late 1980s. They use either various types of extruded plastics that are formed into the prototype shape (Fig. 9) or milled from a solid form according to computer models generated by the designer. This kind of prototyping can save money and time but, it once again, relies on technical and computer knowledge the designer may

not have or cannot afford to bring into the project. The cost of three dimensional modeling computer software can be expensive and the knowledge and training time for the designer can be extensive. The designer is also limited in their choice of materials in the rapid prototyping process, at present the typical materials include ABS plastic and polyester both of which have limitations, one of which is that they are not translucent in nature creating visually soild for evaluation.

In this support document we will look at the off-the-shelf objects as a prototyping tool in which the designer plans a product redesign or improvement of the design with the help of focus groups and market testing. The final prototypes are to be seen as a complete and cohesive product. This is where the design process undertaken in this project differs from the work of Achille Castiglioni, Jasper Morrison and the others that have worked in this area.

Legal Issues

It is important to include a discussion on the legal issues of off-the-shelf or found object design. As designers we should be aware of the ways in which to protect our creations including copyrights, design registrations and trademarks. Even though there are strong historical examples of this way of thinking and designing in the last fifty years it is still important to investigate the legal ramifications of this approach to prototyping. All intellectual property laws cover the same basic idea, the unlawful reproduction and use of images and products. Some of the off-the-shelf items used in this project are manufactured and registered by the companies Ikea and Umbra. However, this project deals with the development of prototypes. A redesign of the prototype would occur to ensure there is no infringement on the original designs of any of the components used. Agreements with the original manufacturers and designers could also be investigated if it is in the best interest of the design to use the original component. Some of the components have no markings indicating designer, company or design registration. These products, we can presume, are mass-produced without design registrations. For something like plastic bowls, cups or products that are mass produced with low costs it may not be in the companies' financial interest to register their designs. It can be a long and costly process to register and maintain a design, as the laws in each country are different and the registration process may have to take place in every country the company plans to market the product. There may also not be significant distinguishing qualities in the design to warrant a design registration or patent. In Canada an industrial design is "the features of shape, configuration, pattern or ornament...applied to a finished article." (Canadian Intellectual Property Office 2) "The design must have features that appeal to the eye" (Canadian Intellectual Property Office 2). Functionality of the object and material choice are not covered by a Canadian design registration. Also in Canada, the designer must have the intention of producing more than fifty units of a designed object in order for it to be considered an industrial design. Any amount less than fifty is considered batch production and covered solely by copyright laws as it is categorized as art or craft.

Materials



Fig. 10

The main components used in this project are made from off-the-shelf injection molded polypropylene (Fig. 10), “a general purpose grade (plastic)...suitable for miscellaneous applications such as food containers”. (Dym 174) The injection molding process allows the designer to produce complex three-dimensional parts in high numbers at a low cost. The development of the injection molding process led “designers and manufacturers to consider plastic parts as an alternative to conventional

materials.” (Muccio145). The use of plastics in design is growing from the translucent shells of the Apple I Mac computer to the body panels in the Saturn line of cars. Ikea Canada currently sells lamps that utilize the translucent qualities of plastics. Discussions with Hans Kooperman, Senior Technical Consultant Polymers Dupont Canada, focused on the use of polypropylene products as lampshades. His only concern was that the prototypes produced for this project have the necessary ventilation for the plastic from the heat generated by the light source. This is achieved by holes drilled into the lampshades in a set pattern. In the manufacturing process these holes could be drilled or punched into the polypropylene form after molding. In this way the manufacture of the lamp prototypes could be similar to the actual process that would occur if the designs went into mass production.

Valk Lamp Prototypes



The Valk design (Fig. 11) is made from components purchased from Ikea, including a salad bowl, a serving bowl, a 12" aluminum candlestick and a Hemma light fixture. In this initial design utilizing off-the-shelf components, the selection was critical. All of the pieces are 'dry fitted' in the store to see if the forms are compatible and to speculate on possible types of assembly. The bowls were carefully selected to insure proper colour matches; bowls of like colour can have subtle differences when made in different batches and at different times.

Fabrication

The original assembly of the light was straightforward. The aluminum candlestick is hollow with a heavy steel weight in the bottom. By taking off the decorative plug in the top of the candlestick a bolt head is revealed. By unscrewing the bolt the candlestick and the weight are separated. It is important to note that the weight of the candlestick not only adds stability but a perceived value to the object in that the consumer assumes it is a solid object. It was important to the design of the Valk lamp to keep this perception intact and add weight to the bottom of the lamp for stability. After the removal of the weight a 1/4" channel was cut into it to allow the light cord to pass through (Fig. 12). A 1/4" hole was



also drilled through the neck of the candlestick to widen the existing hole. The existing aluminum plate on the bottom of the candlestick is only 1/16" of an inch thick. A second 1/8" aluminum plate was fabricated and attached with epoxy to the bottom to create an extension that is received in the bottom lip of the serving bowl. A 1/4" diameter hole was drilled through

the two aluminum plates in line with the channel in the weight (Fig.13). The weight is positioned on the plates and held in place with metal epoxy putty. This allows for a secure bond and is an acceptable form of attachment.

A slightly larger hole is drilled into the serving bowl in line with the hole in the bottom of the candlestick, to allow flexibility of the cord as it comes through to the base of the light. A 9/16" hole is drilled through the side of the bowl at a height of 3/4" on centre. This hole accepts the black rubber grommet that the cord passes through.

The plastic salad bowl serves as the lampshade. A 1 5/8" hole is drilled in the center of the bottom of the bowl. This allows heat and light to dissipate through the top of the shade. The shade is held by the only non ready-made component in the piece, the harp. The harp is constructed of three 5" rings made from 1/8" steel wire welded and mounted to a smaller ring. The smaller ring slips over the threaded Hemma light fixture base. The nut that tightens down onto the fixture holds the harp in place (Fig. 14).



Fig. 14

In the initial design, the different components, the light fixture in the top of the candlestick and the candlestick to the serving bowl base, were held together using silicone. This method of adhesion worked for a time and was seen as an acceptable short-term method of assembly for the prototype.

Safety Testing

The Valk lights and the plastic components used to make them were safety tested in a simple manner. The lampshades were placed on a bare 100-watt light bulb for a period of 1 hour with the hole in the shade straddling the bulb. The bowls did get warm but no melting or colour fading of the plastic occurred. In the second test the finished lights were left on for a period of 12 hours to see if the hole in the shade provided adequate ventilation and if the harp held the bowl far enough away from the bulb. There were no problems in this test and the bowl itself did not get too warm. As a side note one of these units has served as a desk lamp on a regular basis with no discolouration or safety problems for the past twelve plus months. However, the Valk lights went through a redesign because of other design concerns.

Redesign

The initial design of the Valk lights used off-the-shelf components. However, one of the drawbacks was the lack of a switch incorporated in the prototype. The Hemma light fixture was chosen because it allowed for the harp to be simply mounted on the fixture, however, it does not have a switch in the cord. An in line switch

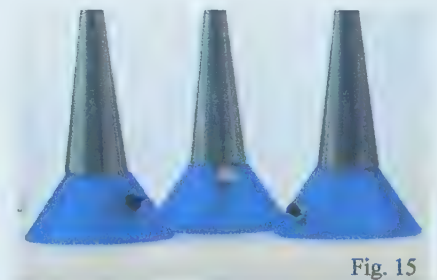


Fig. 15

cannot be easily fitted onto the round cord and was ruled out as an option. Other switch options, all of which were base mounted were explored. This included zinc plated toggle switch to match the candlestick, a black push button, and a black toggle switch (Fig. 15). Each of these seemed to clutter the base and was difficult to use without pushing on the lamp. The last option explored was a touch-activated switch that was hidden in the base of the light. This switch has a dimmer and is activated by touching the aluminum candlestick. This option is the most appealing but becomes the most expensive component in the manufacture of the light.

To incorporate the touch dimmer switch the lamps had to be retrofitted with a mechanical means of joining the plastic base to the candlestick, as there has to be a direct connection between the metal of the candlestick and the dimmer switch (Fig.16). Lamps were retro fitted by drilling two holes through the plastic base and into the aluminum plates and weight in the bottom of the candlestick. Metal screws and washers are used to make a solid mechanical



Fig. 16

connection between the plastic and the candlestick. The ground wire for the dimmer switch is connected to one of the metal screws to allow for a current path to the candlestick so the touch mechanism can be activated. In cases where the silicone failed as the adhesive connection in the top of the candlestick it was replaced by G2 epoxy, which has held up quite nicely over time. The harp was also redesigned at this time. A metal tube with an inside diameter of the threaded portion of the Hemma light fixture replaced the small circular bent wire at the base of the harp. This created more stability and visual appeal than the original design.

Marketing Research

In October of 2001 a focus group study was conducted to evaluate the Valk Lamps. The study was done in collaboration with the University of Alberta School of Business and was held and videotaped in their focus group research lab (Business Building room B-06) using eleven MBA student volunteers. A moderator's guide (appendix 1) was prepared for Dr. Douglas Olsen who conducted the focus group. The qualitative research method of the focus group was chosen because "they have proved to be productive...[in] securing impressions on new product concepts" (Churchill 137). Also "simply observing customers provides a wealth of information, though not necessarily generalizable results" (Lehmann 130). Therefore the focus group should only be one of the steps in marketing research for a new product. It is also suggested that more than one focus group should be conducted to allow for comparative results, however, due to time constraints this was not attempted for this project. This first step into marketing research can give the designer an indication of the strengths and weaknesses of a new product or concept at a fairly reasonable price (an eight-person focus group has an approximate cost of \$4,000). The initial purpose behind the focus group research was to see if consumers would purchase a lamp with a plastic shade, taking into considerations issues of safety, social trends and overall aesthetics. Questions were also designed to see if the incorporation of aluminum in the lamp, by association, gives the plastic more of a high-end market perception. Three types of switches were also evaluated, two different push button switches and the touch dimmer switch. The participants in the focus group were also asked about a retail price point for the Valk Lamp. It is important to note that for this project this was the only type of marketing research conducted. However, if the development of the prototype were to progress, different marketing evaluation methods including follow up focus groups, online evaluations, and questionnaires would be explored.

Focus Group Results

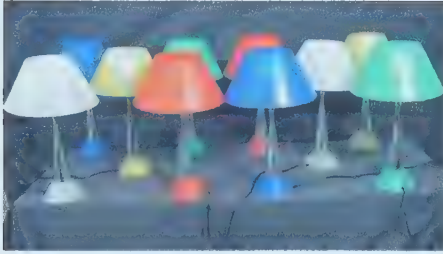


Fig. 17

The results of the focus group were quite surprising. The initial questions revolved around the types of objects the participants categorized as furniture accessories. Although a multitude of answers were given including: pictures, wastebaskets, throw cushions, and

candlesticks; lamps and light fixtures were not. This created a slight problem as time was devoted to exploring the concept of furniture accessories while the group was slightly off topic. When asked about stores that the participants would shop for these items Ikea, Eatons, The Bay and independent boutiques were mentioned. Once the Valk lamps (Fig. 17) were introduced the discussion refocused and the evaluation of the product developed. The product at the start was generally not well received. Many within the group disliked the lightness of the plastic base, as it was seen as being unstable and cheap. The push button switches only added to this perception since activation of the switch requires the user to hold onto the lamp base to stop it from sliding away from them. The touch dimmer was a unanimous choice within the group as the best switch, however the idea of spending more money on it was not. Some participants said that a five-dollar increase would be acceptable while some felt that the touch switch should not add cost to the lamp. The idea of plastic and “cheap” was a recurring one. While the majority of the group liked the aluminum stem, most wanted a different kind of material as the base and shade. One participant indicated that the use of plastic actually cheapened the aluminum in the product. Wood, ceramic and canvas were indicated as materials some of the group would rather have seen incorporated in the lamp. The overall hourglass design of the lamp was liked by most and was seen as classical and simple.

One unexpected comment was the fact that the participants that tended to have less of a problem with the plastic components viewed the product as a child’s lamp, because of the use of vibrant colours (Fig. 18). This is something that was not considered in the mind of the designer during the fabrication of the prototype. This may also be one of the

contributing factors in the participants' low cost assessment of the product. When asked about how much they would spend on the product most participants had a range between fifteen and twenty-five dollars, one even going as low as ten dollars. Only one person recognized that the aluminum component would be fairly expensive and suggested a more realistic retail price of forty-five dollars.

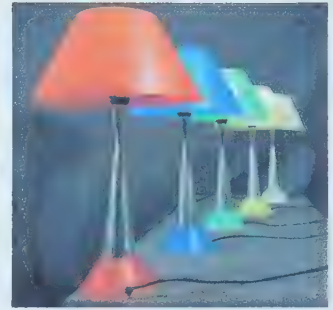


Fig. 18

Only one participant questioned the use of plastic as a safety hazard. Other members within the group felt there was adequate space between the light bulb and the shade and that the hole would dissipate the heat enough. A few of the group wondered if the touch switch could be activated by pets or by cleaning. The stability of the product because of the plastic base was also a safety concern for some in the focus group.

Normally participants in focus group research are selected based on a number of criteria set forth by the marketing company or the client. In this case the MBA students were probably at least four to five years older than the Valk lamp's intended target market. When asked if they could see themselves purchasing the Valk lamp five years ago a number of participants, who would not currently purchase the product, raised their hands. The Valk Lamp as well as the later functional prototypes are meant to be purchased primarily by people in their late teens or early twenties establishing themselves for the first time away from home. This group of consumers may tend to follow trendy or funky styles more so than the MBA students we tested who see themselves as soon to be working professionals. Normal focus group studies can take up to two hours; however, since we used student volunteers over their lunchtime we had only time for a short discussion. Because of this, the nature of the Valk Lamp's design as a product more suited or mood lighting than functionality was not adequately explored. The overhead fluorescent lights were left on during the focus group weakening the effect of the light diffusing through the different coloured plastic shades. If a subsequent focus group were to be conducted, these issues would need to be addressed to give a better demonstration of the design intentions of the Valk lamp.

Mushroom Lamp Prototypes (Fig 19)



Fig. 19

In the spring of 2000 Ikea discontinued carrying both the salad and the serving bowl that were components of the Valk Lamp. This could be seen as a set but instead it clarified some issues that are vital to the off-the-shelf design approach. The designer must make contacts and find suppliers and not solely rely on one retailer to supply them with the raw materials. It also makes the search for raw materials a constant one, in which the designer has to see future potential in objects and purchase them

without an immediate need. The designer has to have the confidence in their ability and in this process to buy bulk quantities of objects that may or may not be used at a later date. The designer must take into consideration the time spent looking for suitable products and budget for it. Discount and dollar stores, because of their high turn over rate and the continued availability of new items, should be visited on a frequent basis. Discount stores often carry leftover stock from larger retailers and therefore cannot guarantee that the item will be in stock at a later date when the designer has a need for it.

The bowls that make up the Mushroom Lamps were found on a trip to Toronto. The trip included a search of various stores for potential raw materials for the continuation of the Valk series. Bowls found at Honest Ed's Discount

Warehouse were of a similar size, however the colours are quite different. Where the Valk lights used

bowls with bright vibrant colours, these bowls are duller earth tones. Still the bowls, the last ones in stock, were purchased and shipped back to Edmonton. The lamps are similar in design to the redesigned Valk Lamps in that they use the touch switch, bowls for

the base and shade, and aluminum candlesticks (Fig 20). However, the Valk lamps use a 12" and the Mushroom Lights use a 10" candlestick (Fig. 21). Visually the Mushroom



Fig. 20



Fig. 21

bowls needed the smaller candlestick. The Valk bowls have straight sides and the elongated feel of the 12" candlestick suits them, whereas it takes away from the relationship of the shade to the base in the Mushroom lamps.

The Mushroom Lamps have an advantage over the Valk lamps in the way the bottom bowl is designed. One of the design concerns with the Valk series is that there is no way to install a bottom piece onto the base. Therefore, the wiring and switch are not protected if the lamp is lifted up or knocked over. The base bowl used in the Mushroom lamps has a slight lip that allows a friction fit of a Sintra bottom plate (Fig. 22). This plate conceals the switch and electronics in the base of the lamp. A finger hole is drilled into the Sintra to allow removal of piece if there is ever a need to access the electrical components.



Fig. 22

Digital Image Prototyping

As technology progresses so does the way in which designers process and create prototypes. Prototypes are no longer confined to three-dimensional representations but can include digital imagery such as computer models and animations. By using digital photography of assembled pieces, the designer can quickly produce different types of products in different combinations. Digital image prototyping can be seen as a logical step from using found objects in working prototypes to using them as raw materials in assembled digital photographs. By having a number of components each with a range of colours, large numbers of combinations are available to the designer for comparison. “Quick prototyping is about acting before you’ve got the answers, about taking chances, stumbling a little, but then making it right” (Kelley 107). Digital image prototyping allows for the designer to make informed decisions about colour and form choices relatively quickly. The digital image prototypes exist only in computer space as two-dimensional images of assembled objects. Selected digital image prototypes were later made into three-dimensional functional prototypes.

Method

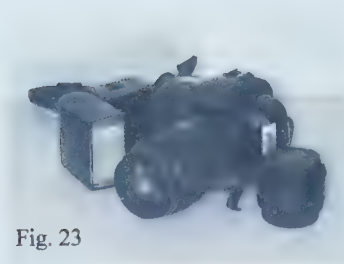


Fig. 23

The initial digital images were photographed on a neutral grey background with the Canon EOS D30 Digital Camera (Fig. 23). It is a single-lens reflex AE-AF digital camera with a built-in flash and focus plane shutter with 36-bit full color (RGB each 12-bit),

single-shot CMOS (*Complementary Metal-Oxide Semiconductor*) direct imaging sensor and a pixel count of 2160 x 1440 dpi. These images were dark and the luminosity of the plastic was not evident (Fig 24). To properly prototype in this method the assembled objects must be seen as being as close to a finished prototype as possible. To accomplish this a fluorescent light table was used as the background and a light box served as the base for

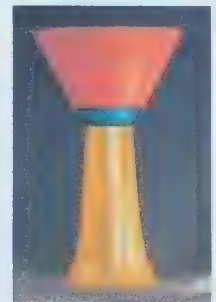


Fig. 24



Fig. 25

the prototypes (Fig. 25). By lighting the table and the box a glow was created in and around the object, they also provided a consistent background. A grid was drawn on the base to indicate where the objects were placed and to ensure the subsequent components of a different colour were placed on the same spot. The camera was fixed on a tripod and its footprint was outlined in case of accidental movement. The benefit of using a digital camera

is that the image can be viewed on the LCD screen immediately and bracketing can occur quickly. Images can be deleted if they are of poor quality and film is not wasted. This method obviates the need to convert printed film into a digital form. By using the digital camera various different combinations are looked at in a significantly short period of time. Images can be shown in a variety of ways including PowerPoint, on the Internet, and printed for hard copy display.

The Canon D30 is a high-end digital camera, however the above method of digital image prototyping could be accomplished with less expensive equipment. Traditional methods of photography could be used to capture the images and then converted into digital media by scanning either photographs or slides. Less expensive digital cameras could also be used. The important factor in the process is the rapid image capture for the purpose of form and colour evaluation. The images must be of uniform size and have similar exposure levels for proper comparison.

One of the benefits of the digital image prototyping process is the conversion of the images into computer movies. The movies, made using Corel Photo-Paint 9 quickly run through each style of lamp showing all the various colour combinations. The movies can be saved in various formats; therefore, they can be shown in an AVI uncompressed format on a computer as part of a presentation or as a QuickTime movie with compression on the internet. The making of the movies allows for a creative way of quickly displaying all the options available to the designer and the client.

Elara Lamp Digital Image Prototypes

The Elara series is assembled to be different styles of open top table lamps. The Elara digital prototypes consist of three different colour vases turned upside down upon which is placed a small children's bowl that comes in 5 different colours. Each series differs in the type of bowl that makes up the shade on the top of the lamp

Elara Series 1 (Fig. 26)



Fig.26

This lamp uses the same five colour bowls as the Valk Lamps. With the different colour combinations a total of 60 digital image prototypes were photographed. The strength in this series is the variety and vibrancy of colours produced by the different combinations of components.

Elara Series 2 (Fig. 27)



Fig. 27

This lamp incorporates the bowls used in the Mushroom Lamps. The three shade colours, green, brown and beige do not have the flare of the first series. The transition, from the base to the shade in this series tends to work better than in the Elara Series 1. The top shade shape better resembles the smaller middle section.

Elara Series 3 (Fig. 28)



Fig 28

This lamp uses four bowls purchased from the Canadian Superstore in Edmonton in the spring of 2001. These larger bowls used do not work well with the base, as the entire piece appears top heavy. There are 44 different prototypes in this series, however the different colours of blue are often hard to distinguish in digital form.

Ananke Lamp Digital Image Prototypes

This series of lamps uses the vases with the open end down as the base. In the first two series the Ikea children's bowl lifts the shade off the top of the vase to create a more visually appealing prototype. With the third series the bowl is placed directly on the vase.

Ananke Series 1 (Fig. 29)



Fig. 29

Once again the five different colours of the shade in this series make it successful. The straight line of the shade is softened by the curve on the base of the lamp. One drawback is the top of the shade has almost the exact diameter as the bottom of the base. Visually this seems a little bit awkward, as the shade would be better if it tapered to a smaller diameter.

Ananke Series 2 (Fig. 30)



Fig. 30

The slight curve of the shade makes this a stronger series than the first, however the limited colours of the mushroom lamps make the prototypes quite dull. If bowls with more vibrant colours with similar dimensions as the mushroom bowls could be found each digital prototyping series that utilizes the mushroom bowl as a component would be considerably stronger. Once again the top of the shade is visually problematic.

Ananke Series 3 (Fig. 31)



Fig. 31

The third prototype in the Ananke series uses two small salad bowls one red and the other purple as the shade to produce six prototypes. It is a somewhat stocky lamp that has playful colour combinations.

Callisto Lamp Digital Image Prototypes

The Callisto series uses the same components of the Ananke series with one difference, the orientation of the vase, yet the two series are considerably different in visual appeal. The vases sit with the open end up and the different shades are placed over the mouth. Although the design is simple it makes for some interesting forms and displays the diversity of the objects.

Callisto Series 1 (Fig 32)



Fig. 32

The straight lines of the shade and the vase work well together in this series. The distance between the shade and the bottom of the lamp is a fairly good ratio. The colours of the five bowls and the three vases produce a majority of good combinations.

Callisto Series 2 (Fig. 33)



Fig. 33

The sweeping curves of the shade make this digital prototype seem top heavy and even unstable. The tapering of the lines of the shade in the first series works better to limit this feeling.

Callisto Series 3 (Fig. 34)



Fig. 34

The small diameter of the bowl here makes it sit higher on the vase than in the previous two Callisto Series shades. This elongates the lamp and produces a well-balanced form. The smaller shade seems to suit the dimensions of the vase better than the previous prototypes in this series. The limited colour choice hampers the digital prototypes, as there are not enough colour variations for an in depth evaluation.

Dione Series Digital Image Prototypes

The Dione series (Fig. 35-37) adds a third element to the Callisto series, the small children's bowl serves as the base of the lamp. These are the same five bowls that are found in the Elara series as the middle component. This third element gives a more elegant style to the overall design and increases the number of digital image prototypes for each series. Similar design issues including colour, dimensions and shade size emerge as in the Callisto Series.

Dione Series 1



Fig. 35

Dione Series 2



Fig. 36

Dione Series 3



Fig. 37

Leda Lamp Digital Image Prototypes

The Leda Series, like the Elara Series, are open top lamp prototypes. The Leda Series only uses the Mushroom bowls and the larger Elara Series 3 bowls as components with the three vase colours. The Valk bowls do not fit well into the vase opening because of their straight sides and the smaller red and purple salad bowls do not work proportionally. The small base of the vase is a weak design point for both the Leda Series.

Leda Series 1 (Fig. 38)



Fig. 38

The setting of the bowl into the mouth of the vase creates an almost seamless contour line. The use of the Mushroom bowls with only one other component seems to lessen their colour deficiency as the subdued colours seem to work here better than in some of the other digital prototypes.

Leda Series 2 (Fig. 39)



Fig. 39

The four colours of bowls that make up the top of the Leda Series 2 are the strength of the prototype. The two different shades of blue make interesting colour choices and allow for evaluation of slight colour differences. Overall the prototype seems top heavy because of the size and dark colours of the upper component.

Telesto Lamp Digital Image Prototype

The Telesto table lamp (Fig. 40) uses the three coloured vases as a base for a small oval white Umbra trash can shade. The spacing between the top of the base and the shade is done with one of the 12" candlesticks. Most of the spacing done in the digital image prototyping method is accomplished by stacking various on-hand components. The oval shade of the Telesto lamp makes for an intriguing digital image prototyping as the use of irregular shapes allows for a 360-degree digital evaluation of the prototype.



Fig. 40

Io Lamp Digital Image Prototype



Fig. 41

The Io Shelf Lamp (Fig. 41) series consists of only three digital prototypes. The three vases are the main component with the small Ikea children's bowls inserted inside.

When lit from above the darker blue, orange and green inserts radiate coloured, almost liquid, light into the

bottom of the vase. Although the design is very simple the effect achieved is quite amazing. Originally designed to be wall sconces (Fig. 42) using the 12" aluminum candlestick, the design was simplified to be a shelf light that is to be seen from below.



Fig. 42

Phoebe and Helene Lamp Digital Image Prototypes

This two sister series uses plastic goblets found at two Army and Navy stores in Edmonton and the Ikea small children's bowls. The Phoebe Series has the red and purple salad bowls as shades and the Helene series uses the Valk bowls. The placement of the shade in the Phoebe series is lower then in the Helene series producing a smaller overall lamp.

Phoebe (Fig. 43)



Fig. 43

The Phoebe Series has a total of sixty digital images. This design is perhaps the most playful of the digital image prototypes. The curves of the three different components work extremely well together. The shape of the shade echoes the base and the distance between the two allows for easy visual comparison. The lines of the goblet are quite playful in the way they interact with the small bowl at the base. The numerous digital images show many unexpected successful colour combinations.

Helene (Fig. 44)



Fig. 44

With two components of five colours and one component with six colours, for a total of one hundred and fifty different combinations, the Helene Series is the largest digital image prototyping collection. Subtle and unique colour combinations emerge that may not be immediately clear to a designer not working with the digital image prototyping method. The Helene Series is successful not only because of its elegant forms but because of the volume of images it displays.

Toadstool Lamp Digital Image Prototype



Fig. 45

The Toadstool series (Fig. 45) uses the red and purple salad bowls and the six different coloured goblets seen in the Phoebe Series. The goblet is inverted, resting on the mouth, and the shade is held off the goblet by a pop can that provides the perfect height. The use of only two components in this series works because of the vibrant colours in the goblet interacting with the colour of the bowls.

Rhea Lamp Digital Image Prototype



Fig. 46

The Rhea (Fig. 46) series uses the bowls and cups found at the Canadian Superstores in Edmonton. They are hanging lamps where the light illuminates the bottom bowl of the assemblage. The stacking of the components is made easy by a bottom lip on the two bowls. With three different components, of four colours each, a total of sixty-four digital images are created. The strength of this series is the fact that all the components come from the same manufacturer therefore the colours and shapes are designed to compliment each other.

Applications for Digital Image Prototyping

Using the digital image prototyping method the designer can make informed decisions on what combinations would best make three-dimensional working prototypes. The decision process could involve the client, focus groups or internet evaluation. A recent development in product evaluation is the use of the internet to aid in market research. Two companies in Alberta have recently approached this in different ways.

Pure Design based in Edmonton sends out informal emails to friends, colleagues and customers to get an informed opinion about prototypes. In the spring of 2001 Pure Design was considering the production of a newly designed coffee table using interlocking plywood shapes. Two different styles of the table were emailed to people for their opinion. Pure Design went on to manufacture both tables, however, they did attempt to use some type of market research to make a more informed decision.

Evans Consoles Inc., a company based in Calgary that specializes in the design and manufacture of technical furniture, uses the internet as a more formal research tool. In July 2001, Evans conducted a conceptual review of a proposed product, soliciting an exclusive group of industry leaders in the design field across Canada. As part of the internet research each participant had to sign a non-disclosure agreement and fax a copy of it back to Evans Inc. Once the non-disclosure agreement was received the participant was emailed a password and URL for a secure website. The evaluation was only available to those with a password and the website was only active for one day. The website, once accessed, went through the various product specifications, options and designs. The participant was asked to evaluate the product and its components on a scale from 1 to 10. There was space set aside for comments on each component as well as at the end of the evaluation for the overall impression of the product and its capabilities.

Both Pure Design and Evans Consoles Inc. used the internet to evaluate a product that they were planning to put on the market. Using digital image prototyping the designer could do online evaluations of colour, form and possible price points for a product they are considering for manufacture. It can be an informal evaluation or a more structured one; either way the costs are relatively inexpensive when compared to traditional focus group research.

From Digital Image Prototyping to Working Prototypes

The use of all plastic assemblages in the digital image prototyping phase of the project led to the idea of developing all plastic lamps. The Valk and Mushroom series have merit of their own. However, the translucency and warmth of the lit plastic is somewhat lost within the coolness of the aluminum lamp body. Using the digital image prototyping method as the first step, all-plastic lamps were developed as working prototypes.

Io Shelf Lamps



Fig. 47

The fabrication of the Io Shelf Lamps (Fig. 47) is the simplest of the working prototypes. A rubber grommet is installed $7/8''$ from the bottom of the vase bottom in a similar fashion to the Valk and Mushroom Lamps. An off-the-shelf candelabra socket and in-line switch cord set is then cut just below the socket and threaded through the grommet. Into the small Ikea bowl a $1\ 1/8''$ hole is drilled to receive a welded metal component that holds the light fixture in place (Fig. 48). The

welded component consists of a $1\ 1/8''$ outside diameter pipe welded to a $1\ 3/4''$ metal washer. The metal component then slides into the small bowl, resting with the socket $1/2''$ away from the bottom of the bowl. The wires are reconnected with solder and wrapped in electrical tape. The small bowl is then nestled into place in the vase and stays because of gravity and a friction fit.



Fig. 48

Toadstool Cocktail Lamp Prototypes



Fig. 49

The Toadstool Lamps (Fig. 49) are fabricated similarly to the Io Shelf Lamp. As in all the non-hanging prototypes a rubber grommet is installed towards the bottom of the lamp base to allow the cord to pass through. The Toadstool lamps use the same off-the-shelf candelabra set as the Io Shelf Lamp. Into the top of the lamp base a 1 1/8" hole is drilled to accept the metal socket holder and harp component, which is similar to the Io socket holder (Fig 50). Onto the bottom of the washer a metal ring is welded with a diameter slightly over 1 3/4" this is to ease the visual transition from the goblet bottom to the harp. A harp of three metal rings is made similar to the Valk harp design using 1/8" welding rod and welded to the socket holder to produce one unified piece (Fig 51). The socket after being resoldered is pushed up into the metal retainer and harp and the spring clips lock against the inside of



Fig. 50



Fig. 51

the metal tube. The entire piece is then friction fitted into the top of the lamp base, a little electrical tape is applied to keep the socket holder from rotating when a light bulb is inserted. Into the top of the shades, with the aid of templates, a circular pattern of seven holes is drilled to allow for heat dissipation. Five Toadstool Lamps were constructed, two matching sets with green and light blue goblets with red shades and a single blue goblet with the lone purple shade.

Helen Table Lamp Prototype



Fig. 52

Only one Helene lamp (Fig. 52) has been constructed. It was fabricated out of unused components from the Toadstool and Valk lamps. The combination of a Yellow Valk shade, orange Toadstool goblet and small yellow base bowl was assembled after many other prototypes were finished. It is a successful colour combination as well as form. The fabrication of the Helene lamp is similar to the Toadstool Lamps. A grommet is positioned in the base bowl. A hole with a $\frac{1}{4}$ " diameter is drilled into the top of the base and the bottom of the goblet. A $1\frac{1}{4}$ " high solid steel weight with a center hole is manufactured to fit into the base of the goblet. A threaded tube is passed through the base, weight and goblet bottom (Fig. 53). Tightening two bolts one on top of the weight and one under the base the bottom components are securely held together. Like the Valk lamps the weight is designed to give the plastic stability and a sense of quality through weight. A $\frac{3}{4}$ " thick piece of wood, with a $1\frac{1}{8}$ " center hole, is cut and sanded



Fig. 53



Fig. 54

with a slight taper to friction fit into the goblet opening. The Helene lamp uses the same off-the-shelf candelabra and a similar harp design to the Toadstool lamp. The wooden insert is painted yellow and the socket holder and harp piece is painted orange to add a sense of whimsy to the entire piece (Fig 54).

Rhea Hanging Lamp Prototypes and Batch Production



Fig. 55

There are only four components to the entire Rhea lamp (Fig. 55) system including a salad bowl, serving bowl, a cup and the Hemma light fixture. The sixty-four digital image prototypes were reviewed to find different colour combinations for fabrication.

Batch Production

The Rhea lights were produced in a batch production run of twenty-five to evaluate the fabrication method, and to test the integrity of the plastic parts. Some cracking will occur in post molding machining. In the run of twenty-five, one large bowl, two small bowls and four cups were damaged. Each set of twenty-five components is worked consecutively therefore machines only need readjusting for the next set of components. This shortens production time and allows the designer to concentrate on one aspect of the prototype at a time.

Fabrication

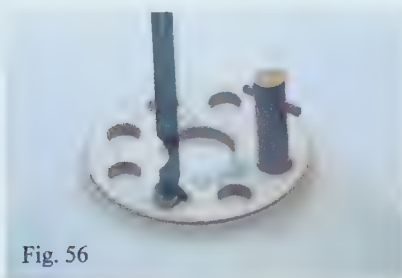


Fig. 56

The fabrication method in this design was aided by the use of templates. The large bowl has a central 1 5/8" diameter hole that accepts the threaded Hemma light fixture. Radiating around this hole are eight half-inch holes in a circular pattern. The template for the drilling is made in computer space



Fig. 57

to get the proper dimensions to fit into the bottom lip of the salad bowl. First, one of the surrounding holes is drilled and then plugged with a dowel of the same size (Fig. 56). This allows for rapid and safe drilling of the remaining holes and the centre hole. The small bowl and cup are drilled in the same manner (Fig. 57). The cord of the Hemma light fixture has to be cut to slide the small bowl and cup into place then spliced back together. The plastic

nut that threads onto the Hemma light fixture holds on the large bowl, and the upper components of the lamp are held in place by gravity.

The light radiating from the large bowl into the small bowl highlights the simplicity of this design. The holes in the design also allow for heat to dissipate through the top of the lamp. The overall cost of this design is low and the fabrication time is short. The use of digital image prototyping allowed for quick assembly because the colour choices made before assembly started. The packaging for the Rhea lamp (Fig. 58) would also be quite simple. All of the components fit within the large bowl, packing the entire lamp including instructions into its dimensions. The entire package could then be shrink wrapped for shipping.

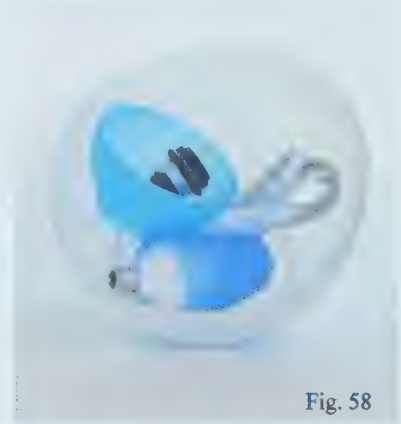


Fig. 58

Conclusion

The use of off-the-shelf components as a means of prototyping or producing products has a rich history in industrial design. Working within this tradition allows a designer to quickly develop ideas and concepts in a relatively inexpensive manner. A designer without the financial means to use conventional or rapid prototyping technologies may be able to use off-the-shelf components to produce functional prototypes for market research. The use of focus group research gives the designer an insight into potential problems and design concerns of a proposed prototype at the initial stage of product development. In the case of this project, the focus group comment on the Valk lamp design being a children's product was surprising to the designer. It was not the original intent behind the design, as the use of aluminum was intended to give the lamp an upscale market perception. The focus group almost unanimously felt the plastic cheapened the overall product although the designed form was classical in nature.

The introduction of the digital image prototyping method further increases the options available to the designer working with off-the-shelf components. Digital image prototyping provides the designer with a large image databank that allows for the quick evaluation of form and colour choices. Although the camera used to capture the images in this project was expensive, similar results could be achieved with more modest equipment. Using the digital image prototyping method the best images were selected to be fabricated into all-plastic functional prototypes. In these prototypes cost saving steps such as using simpler methods of assembly and the use of an off-the-shelf in-line switch were implemented to keep the product within perceived market values. With the increase of online marketing research digital image prototyping could be used as a method to test consumer interest, opinions and other initial design concepts without the need to fabricate working prototypes. The use of off-the-shelf design and digital image prototyping can be seen as a cost effective design strategy in conjunction with market research methods to evaluate potential consumer products.

Recommendations

The focus group research component of this project only touched on the possibilities of market evaluation as it relates to product design. A comparative evaluation between traditional focus group research of three-dimensional prototypes and that of digital images is needed to see if there is a significant difference in the perceptions of the target market groups to the prototypes. Similarly, whether or not there is a significant difference required in the process of information gathering between three-dimensional prototypes and digital images should be looked at. The emerging trend in e-commerce needs this comparative evaluation to better prepare information for investigation. The digital image prototyping methodology should be explored further as a means of testing prototypes over the internet and discovering consumer trends in different target markets.

Legal issues regarding the use of off-the-shelf components should be further explored. The existing intellectual property laws and how they pertain to the raw materials used in the prototyping method should be clarified if the designs are to be manufactured using the original components. If a design is “published” over the internet for the use of market or consumer evaluation how is the ownership of the design affected? Legal issues involving digital imagery and ownership needs clarification and updating, otherwise it may evolve into a situation similar to mp3 file sharing, where confusion over these rights is an ongoing concern. With the shrinking and globalization of the world, due care must be taken when using the internet. A designer’s idea or prototype could easily be copied and manufactured with emerging rapid prototyping and fabrication methods before the product had a chance to get to market.

Digital image prototyping could also be used to create a virtual catalogue of potential products. In this project the simple fabrication of the lamps from several different coloured components could allow for customers to design their own lamp from a variety of choices. This would create personalized products for the consumer market, in which design for home assembly would be simple and cost effective.

Bibliography

Beringer, Hubert. "Plastic Arts." *Azure Design Architecture and Art*. July/August 2000
Trans. Julie Crysler. 45.

Boyer, Charles-Arthur and Federica Zanco. *Jasper Morrison*. Paris: Dis voir, 1999.

Buchanan, Richard and Victor Margolin eds. *Discovering Design, Explorations in Design Studies*. Chicago: University of Chicago Press, 1995.

Canadian Intellectual Property Office. *A Guide to Industrial Designs*. Hull, Quebec: Publications Centre Canadian Intellectual Property Office, 2000.

Churchill, Gilbert A. *Marketing Research, Methodological Foundations*. 5th ed. Fort Worth: The Dryden Press, 1991.

Dym, Joseph B. *Product Design with Plastics: A Practical Manual*. New York, NY: Industrial Press, 1983.

Ferrari, Paolo. *Achille Castiglioni*. Milan: Electa, 1984.

Fiell, Charlotte and Peter Fiell. *Chairs*. New York: Taschen, 2001.

Fiell, Charlotte and Peter Fiell. *Design of the 20th Century*. New York: Taschen, 2001.

Greenbaum, Thomas L. *Moderating Focus Groups: A Practical Guide for Group Facilitation*. Thousand Oaks, California: Sage Publications, 2000.

Gullman, Larry S. *Rapid Product Design and Development: Tools and Strategies for Shrinking Time to Market*. Menlo Park, California: SRI International, Business Intelligence Program, 1991.

Kelley, Tom and Jonathon Littman. *The Art of Innovation: Lessons in Creativity from IDEO America's Leading Design Firm*. New York: Doubleday, 2001.

Kratz, Martin. *Protecting Copyright and Industrial Design*. 2nd ed. Toronto: Carswell Thomson Professional Publishing, 1999.

Lehmann, Donald R., Sunil Gupta, and Joel H. Steckel. *Marketing Research*. Reading, Massachusetts: Addison-Wesley, 1998.

Malhotra, Naresh K. *Marketing Research An Applied Orientation*. 3rd ed. Upper Saddle River, New Jersey: Prentice Hall, 1999.

Morgan, David L., ed. *Successful Focus Groups: Advancing the State of the Art*. Newbury Park, California: Sage Publications, 1993.

Muccio, Edward A. *Plastics Processing Technology*. Materials Park, OH : ASM International, 1994.

Norman, Donald A. *The Design of Everyday Things*. 1st ed. London : MIT, 1998.

Otto, Kevin N., and Kristin Wood. *Product Design: Techniques in Reverse Engineering and New Product Development*. Upper Saddle River, New Jersey: Prentice Hall, 2001.

Papanek, Victor. *Design for the Real World: Human Ecology and Social Change*. New York: Pantheon Books, 1973.

Scheuer, Winfried. "The Accidental in Design." *Design Process, Progress, Practice*. Ed. James Peto. London: Design Museum, 1999

Sweet, Fay. *Frog : Form Follows Emotion*. New York : Watson-Guptill, 1999.

Ulrich, Karl and Steven D. Eppinger. *Product Design and Development*. 2nd ed. Boston: Irwin/McGraw-Hill, 2000.

Williams, Pamela. *How to Break into Product Design*. 1st ed. Cincinnati, Ohio: North Light Books, 1998.

Electronic Sources

Achille Castiglioni Design October 16 1997-January 8 1998. Homepage. The Museum of Modern Art, New York. 28 October 2001.

<<http://www.moma.org/exhibitions/castiglioni/intro.html>>

Achille Castiglioni Menorah 1985. 28 October 2001.

<http://www.retromodern.com/exhibit/alessi_nip/1985b.htm>.

Are Internet Focus Groups an Oxymoron. Quirk's Marketing Research Review, Vol. XII No. 11, December 1998. 28 October 2001.

<http://www.cyberdialogue.com/news/articles/reprint/12-11-98-focus_oxymoron.html>.

Castiglioni. Ventura Design. 28 October 2001.

<<http://www.venturadesign.com.au/html/castiglioni.html>>.

Canadian Intellectual Property Office. Homepage. 27 September 2001. The Canadian Intellectual Property Office. 28 October 2001. <<http://cipo.gc.ca/>>.

Curator's Essay. The Museum of Modern Art, New York. 28 October 2001.

<<http://www.moma.org/exhibitions/castiglioni/essay.html>>.

Evans Online. Homepage. 24 October 2001. Evans Consoles Inc. 28 October 2001.

<<http://www.econsole.com/>>.

Focus Group Research. 28 October 2001.

<<http://dh1a-2.coventry.ac.uk/taskforce/Documents/fogrweb.html>>.

Gibbs, Anita. "Focus Groups". Social Research Update, Issue 19. Department of Sociology, University of Surrey. 28 October 2001.

<<http://www.soc.surrey.ac.uk/sru/SRU19.html>>.

Garson, G. David. *Focus Group Research.* North Carolina State University. 28 October 2001. <<http://www2.chass.ncsu.edu/garson/pa765/focusgroups.htm>>

Jasper Morrison. Busstops. 28 October 2001.

<<http://www.uestra.de/busstops/morrisonbio.html>>.

Manufacturing by Rapid Prototyping. The University of Bath. 28 October 2001.

<<http://www.bath.ac.uk/~en7nh/rp.htm>>.

Nine Dots Inc. Rapid Prototyping. Homepage. January 2000. Nine Dots. Inc. Edmonton, Alberta. 28 October 2001 <<http://www.ninedots.ca/>>.

Nucifora, Alf. "The Internet is Revolutionizing Use of Focus Groups". American City Business Journals Inc. 28 October 2001.

<<http://phoenix.bcentral.com/phoenix/stories/2000/11/20/smallb5.html>>.

Nucifora, Alf. "Video Streaming Over the Internet is Revolutionizing Use of Focus Groups". American City Business Journals Inc. 28 October 2001.

<<http://eastbay.bcentral.com/eastbay/stories/2000/10/02/smallb6.html>>.

The Law of Industrial Design. Shapiro-Cohen. 28 October 2001.

<<http://www.idealaw.com/lawinddesign.htm>>.

The Rapid Prototyping Homepage. Homepage. 14 October 2001. 28 October 2001.

<<http://www.cc.utah.edu/~asn8200/rapid.html>>.

Using Ice for Rapid Prototyping. 31 July 2000. 28 October 2001.

<<http://composite.about.com/library/PR/2000/blumr1.htm?iam=dpile&terms=%2Brapid+%2Bprototyping>>.

World Intellectual Property Organization. Homepage. October 28, 2001.

<<http://wipo.int>>.

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- Fig. 1 Papanek, Victor. *Design for the Real World: Human Ecology and Social Change*. New York: Pantheon Books, 1973. Pg.48
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- Fig. 4 Fiell, Charlotte and Peter Fiell. *Chairs*. New York: Taschen, 2001. Pg.43
- Fig. 5 < http://www.retromodern.com/exhibit/alessi_nip/1985b.htm>.
- Fig. 6 Scheuer, Winfried. "The Accidental in Design." *Design Process, Progress, Practice*. Ed. James Peto. London: Design Museum, 1999
- Fig. 7 Beringer, Hubert. "Plastic Arts." *Azure Design Architecture and Art*. July/August 2000 Trans. Julie Crysler. Pg. 45
- Fig. 8 Beringer, Hubert. "Plastic Arts." *Azure Design Architecture and Art*. July/August 2000 Trans. Julie Crysler. Pg. 45
- Fig. 9-23 Michael Syms
- Fig. 24 Michael Syms and Cezary Gajewski. February 2001
- Fig. 25 Michael Syms
- Fig. 26-28 Michael Syms and Cezary Gajewski. March 2001
- Fig. 29-58 Michael Syms

Appendix

MODERATOR'S GUIDE

ALUMINIUM/PLASTIC LAMP STUDY

Michael C Syms

March 2001

- 2.3 Do you have any safety concerns about the product
- 2.4 Would you consider purchasing a lamp that uses a plastic shade?
Why or Why not?

Pen and Paper task

Switch Questions

- 3.1 What switch most appeals to you
- 3.2 Would you be willing to spend an additional sum of money for the touch switch, if so how much
- 3.3 Would you spend an additional \$20.00 dollars for the touch switch

Final Questions

- 4.1 How much would you expect to pay for this product
- 4.2 At which retail stores would you expect to find this product
- 4.3 What are your overall impressions of the design of this product

Welcome and Instructions

Introduction of Facilitator

Brief comment on topic

Participants introduce themselves

Thank you to the participants

General Questions

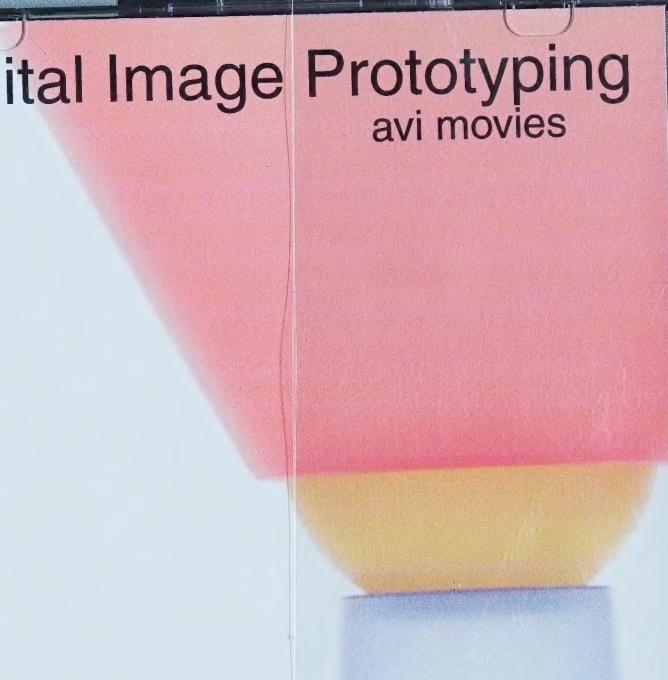
- 1.1 What do you consider to be Furniture Accessories
- 1.2 What type of Furniture Accessories have you purchased recently
- 1.3 At what type of retail store do you most often purchase these items
- 1.4 Do you buy an item because it fits into a current trend
- 1.5 Do you buy a more timeless item so it can fit into any future redecorating plans

Specific Questions

- 2.3 What are your initial impressions of the lamp
- 2.2 How do you feel about the use of aluminum with plastic

Digital Image Prototyping

avi movies



Michael Syms
support cd for MDes Thesis document 2001

